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U-603382

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Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Information Regarding Removal of the Automatic Static Var Compensator (SVC) Freeze During Emergency Diesel Generator Parallel Operation with the Offsite Source at Clinton Power Station

Dear Madam or Sir:

By letter U-602972, dated May 4, 1998, an application for amendment of the Clinton Power Station (CPS) Operating License No. NPF-62 was submitted pursuant to 10CFR50.90 with regard to the installation of Static Var Compensators (SVCs) to provide voltage support for plant loads when supplied with offsite power. The amendment application noted that SVCs were to be installed for the CPS Reserve Auxiliary Transformer (RAT) and the Emergency Reserve Auxiliary Transformer (ERAT) and requested incorporation of a new Technical Specification (TS) specifying operability and testing requirements for the SVC protection systems. The Nuclear Regulatory Commission (NRC) Staff subsequently approved this application on October 9, 1998, as Amendment 117.

An SVC Design Report was included as an attachment (i.e., Attachment 6) to the May 4, 1998, amendment application for the SVCs. In Section 2.6.2 of that particular report, operation of one of the SVC protection systems, i.e., programmable high speed controller (PHSC), with an emergency diesel generator (EDG) operating in parallel with the offsite electrical power system, was discussed. This section identified that "to minimize the impact of system failures, the SVC PHSC will automatically freeze the SVC when an EDG is paralleled with its corresponding SVC." This approach was taken primarily because no extensive analysis of such parallel operation under worst-case loading conditions had been performed at the time. Recently, however, an extensive analysis to dynamically model the control interaction of the EDG and the RAT(or ERAT) SVC was performed. The results of this analysis were provided in a report prepared for CPS. The results of this analysis demonstrate that parallel operation of an SVC and an EDG is stable for all postulated system perturbations. Further, the report concludes with the recommendation that the SVC PHSC controls should be allowed to continuously control the 4.16 kV voltage for the RAT or ERAT even with the EDG on line and operating in parallel with the RAT or ERAT.

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In light of how the automatic SVC freeze feature was described in the aforementioned license amendment request (resulting in Amendment 117 to the CPS Operating License), this letter is being submitted to inform the NRC staff of AmerGen Energy Company's, LLC, (AmerGen's) intent to remove (i.e., no longer utilize) the automatic SVC freeze signal to the RAT (or ERAT) SVC PHSC when an EDG is online (i.e., paralleled with an offsite source). The change is being implemented in accordance with the requirements 10 CFR 50.59, "Changes, Tests and Experiments," as no changes to the CPS Technical Specifications are required, and no unreviewed safety question is involved. Additional information regarding the removal of the SVC freeze feature is provided in Attachment 1 to this letter.

Sincerely yours,

J. M. Heffley
Vice President

JLP/blf

Attachment

cc: NRC Clinton Licensing Project Manager
Regional Administrator, Region III, USNRC
NRC Resident Office, V-690

Information Regarding Removal of Automatic Static Var Compensator (SVC) Freeze During Emergency Diesel Generator Parallel Operation with the Offsite Source at Clinton Power Station

An offsite electric power system and an onsite electric power system are provided for the Clinton Power Station (CPS) pursuant to 10CFR50, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," GDC 17, "Electric Power Systems." Offsite power is the preferred and normal source for the 4.16 kilovolt (kV) Engineered Safety Features (ESF) buses. An offsite source of power for the unit Class 1E alternating current (AC) power system is via the Reserve Auxiliary Transformer (RAT) which is connected to a 345 kV offsite network with multiple incoming lines. The second offsite source of power for the unit Class 1E AC power system is via the Emergency Reserve Auxiliary Transformer (ERAT) which is connected to a separate, independent 138 kV offsite network. These circuits (i.e., the RAT and ERAT) provide two qualified offsite circuits required by Technical Specification (TS) 3.8.1, "AC Sources--Operating" and 10CFR 50, Appendix A, GDC 17.

In 1997, CPS staff determined that as a result of load growth, the voltages on the CPS offsite sources could not be maintained above the minimum required value assuming a loss of coolant accident (LOCA) and unit trip with certain offsite electrical transmission network (i.e., grid system) conditions. As a result of this determination, one Static Var Compensator (SVC) to the secondary (i.e., 4.16 kV) side of the RAT and the other SVC to the secondary (i.e., 4.16 kV) side of the ERAT were installed at CPS to help correct this voltage condition. Amendment 117 to the CPS Operating License No. NPF-62, incorporated a Limiting Condition for Operation (LCO) and associated Surveillance Requirements (SR) for the SVC protection systems under new TS 3.8.11, "Static VAR Compensator (SVC) Systems." The addition of SVCs helps to maintain voltages at CPS for both offsite electrical power sources consistent with the "capacity and capability" requirements of GDC 17. Tripping of the SVC in response to an SVC failure or abnormal condition does not result in a loss of power from the offsite sources.

The function of the SVC system is to maintain the RAT and ERAT 4.16 kV secondary windings output voltage at a level that provides sufficient voltage to the CPS Class 1E distribution system under all loading conditions, including LOCA response, for the grid system voltage range. In addition, each SVC is designed to "freeze" such that its design function of regulating voltage on the secondary side of the RAT or the ERAT does not result in any adverse interaction between its control function and the control function of another AC power source (e.g., an EDG) when the two AC power sources are operated in parallel with each other. The action of freezing the SVC control function ensures that the SVC does not attempt to respond to bus voltage transients inherent in the process of synchronizing and operating the sources in parallel, such as during surveillance testing.

Because of the condition described above, the freezing of the SVCs results in the SVCs not having the ability to respond to grid system fluctuations during EDG surveillance testing. This requires EDG testing to be scheduled during periods of the day when the grid system voltage is stable. Since 24-hour EDG testing is now able to be completed with the unit on line (as allowed by Amendment 132 to the CPS Operating License, dated October 2, 2000) it may not always be possible to perform the 24-hour EDG surveillance testing when the grid system is stable.

To address grid system stability concerns during 24-hour EDG testing, consultants were contracted to model the interaction between the EDGs and the SVCs. The main purpose of this study was to determine if there would be any control interaction problems if the SVCs continuously controlled voltage while an EDG was operating in parallel with the offsite source during testing. The scope of this study included analyses of various transient conditions including system perturbation cases and several different synchronizing scenarios with the SVC continuously controlling voltage.

Results of the analyses demonstrate that parallel operation of the SVCs and EDGs is stable for all postulated system perturbations. The analyses also demonstrate that leaving the SVCs in active control during EDG parallel operation with the offsite source does not result in unacceptable interactions between the SVC voltage control and the EDG voltage regulator, and hence does not adversely impact the performance of the Auxiliary Power (AP) system. The report concluded that the SVC controls should be allowed to continuously control the 4.16 kV voltage for the RAT and ERAT even with the EDG online.

Design changes (i.e., Engineering Change Notices (ECNs) 32181, 32182 and 32183) have been prepared to remove the automatic SVC freeze signal to the RAT (or ERAT) SVC controller when an EDG is online*. The reconfigured circuits will prevent freezing the SVC output signal during the parallel operation of the Division 1, Division 2 or Division 3 EDG with the offsite source (RAT or ERAT). The changes associated with the above ECNs were reviewed against the criteria of 10CFR50.59, "Changes, Tests and Experiments." The review concluded that the changes do not involve an unreviewed safety question nor do they involve a change to the Technical Specifications.

* The freeze signal will remain in place (i.e., unmodified) for the interaction between the RAT and ERAT.